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Ornamental Fish trade in Sri Lanka: An Economic Perspective

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Abstract

Exporting of ornamental fish is much lucrative industry in today. Sri Lanka is one of the important country in that context by having significant market share in world trade. In this paper an economic assessment of ornamental fish trade in the decade of 2000-2010, with special reference to the Sri Lanka was carried out. Annual growth rate of ornamental fish trade, compound annual growth rate, and economic measures such as Revealed comparative advantage (RCA), Relative import advantage (RMA), Relative Trade advantage (RTA), and changes in the unit value of ornamental fish over the decade of 2000-2010 were studied. Relative Trade advantage and Relative competitive advantage results indicated that Sri Lanka has huge potential over the exporting of ornamental fish and it was competitive although there were fluctuations in the annual growth rate. Furthermore it is recommended that, Expansion of ornamental fish exporters, subsidies in the industry may be impetus over the increase export earnings.

Keywords: Economic analysis, revealed competitive advantage, relative trade advantage, ornamental fish, Sri Lanka.

Introduction

Earnings of ornamental fish exports provide significant source of income to exporting countries, though there are limited countries actively involved in that. Data on the UNCOMTRADE exemplifies that total world ornamental export value in year 2010 was US $ 337,082,558 meanwhile global ornamental fish import trade value in same year was US $ 15, 509, 000[1]. UNCOMTRADE data also reveals that Singapore, Spain, Japan, Malaysia, and Indonesia predominant in exporting ornamental fish to the world. Major importers in the year 2010 were consisted with the USA, UK, Singapore, Germany, and France respectively according to their import value. In overall it is growing industry which has capability in growing consistently[2].

Sri Lanka, as a country which has highest export potential in exporting ornamental fishes to world, gain immense success in this industry. In year 2000, it represents 4.2% in total world market share which was among the 7th place[3]. Sri Lankan ornamental fish industry began in early 1920 and 1930s. Since the increment of exporters from Colombo in 1950s, trade of fish was amplified[4]. In addition to that Sri Lanka encompasses with the number of unique environments it has a highest capability of developing this sector in the economy.

In Sri Lanka two sectors of ornamental fish trade can be identified. This includes the marine segment as well as the fresh water segment. It has been estimated that 50% to 60% of ornamental fish exports are wild-captured marine fishes while remainder is fresh water fishes[5] 52 species of fish from 21 families were collected from freshwater habitats and exported from Sri Lanka during the 2005 and 2006[6]. Major exporting species is *Monodactylus argenteus*. In addition to that major ornamental export marine fish from Sri Lanka is the *Dascyllus trimaculatus*[5].

In this research the main objective was to find out the export competitiveness of the Sri Lankan ornamental fish market and find out the relevant modifications to sustain the industry in economical feasible manner in obtaining higher share in world market furthermore.

Material and Methods

Data with relation to the exporting and importing of ornamental fish in Sri Lanka and world were obtained from the United Nations commodity trade statistics database (UNCOMTRADE)[1]. Data with relation to the Sri Lankan and world total exports in considering years have been obtained by the World trade organization statistical database (WTO)[7]. In this Research data over the period of 2000 to 2010 were taken into the consideration.

From the obtained value the following indices were calculated in order to identify the behavior of export ornamental fish trade in Sri Lanka.

Annual growth rate =

$$\frac{\text{Exporting value of } i^{th} \text{ year- Exporting value of } j^{th} \text{ year}}{\text{Exporting value of } j^{th} \text{ year}}$$

Where j and i is consecutive years and i>j

Compound annual growth rate is given by:

Compound annual growth rate[8] = ((Last year/ First year) ^ (1-1/n-1))-1

In addition to that to find the export competitiveness of the ornamental fish export from Sri Lanka, index developed by the Balassa were used.

RCA = (Xi,j / Xw,j) / (Xi. tot / Xw. tot)[9]

Where, RCA= Balassa index/ Revealed comparative advantage, Xi,j denoting country i's export of product j, Xi, tot denoting country i's total exports, Xw, j denoting world's export product j; and Xw, tot denoting total exports in the world.

Revealed Comparative Advantage is used widely owing to its simplicity in calculation and easiness in interpretation[10]. If RCA >1, comparative advantage is revealed. If RCA <1, the country normally possess the relative disadvantage status. The index, by definition, is sensitive to both the number and classification of countries and industries[11]. In some occasions RCA sometimes provide incomparable results. In such cases revealed symmetric comparative advantage (RSCA) to evaluation of export competitiveness[12].

$RSCA_{ij} = [RCA_{ij}-1] / [RCA_{ij}+1]$

In addition to that to find out whether particular country has, advantage over importing of particular product, Revealed Import Advantage has been used.

RMA = (M i,j / M w,j) / ($M_{i,}$ tot / M_{w}. tot), RMA= Relative import advantage, $M_{i, j}$= Importing value of ornamental fish for Sri Lanka, $Mw_{, j}$=World ornamental fish import value, $M_{i, tot}$ = Total Merchandise import value of Sri Lanka, $M_{w, tot}$ = Total Merchandise import value of world.

By using the Revealed comparative Advantage and Revealed import Advantage value Relative Trade advantage (RTA)[2] of particular country can be evaluated as,
RTA = RCA-RMA

Countries with the positive values of RTA stated higher potential in exporting particular product to rest of the world and countries with lower and negative RTA exemplifies that those countries import much of that product outside from world.

In addition to the above calculations, changes of market share of ornamental fish of country also studied[2.]

Changes in market share=
Countries export of product at time p/ world exports
Countries export of product at time (p-1)/ world exports at time (p-1)

Results and Discussion

With relation to the annual growth rate of the ornamental fish export from Sri Lanka, figure-1, indicated that fluctuation in different magnitudes over the years.

Lowest annual growth rate was shown in the year 2001 and peak value was recorded in the year 2003. From the peak value there was fluctuation in the ornamental fish exporting values and again in year 2007 and it shows the declining in growth rate of the exporting. Compound annual growth rate of the industry shows that there was significant lower growth rate in the industry as shown in figure-2. From 2005 onwards industry show positive growth rate but it has a declining trend. This same pattern was obtained by the Jayalal and Ramachandran[8].

Relative comparative advantage over the decade of 2000-2010 in Sri Lanka shows that Sri Lanka has highest competitiveness of exporting of ornamental fish to rest of the world according to figure-3. RCA values over the decade was significantly higher than 1 and highest value was recorded in the year 2006. In this year Sri Lanka has recorded US $ 85.39 million export to the world. In the period of 2003 recorded the lowest competitiveness and respective RCA value for that year was 36.09. During the year 2000-2010 RMA values vary between the 0.92-1.29. RTA values over the decade changes from the 34.8 to 52.82. Peak value of the RTA was recorded in the year 2006 and lowest value was recorded in the year 2003 as represented in table-1.

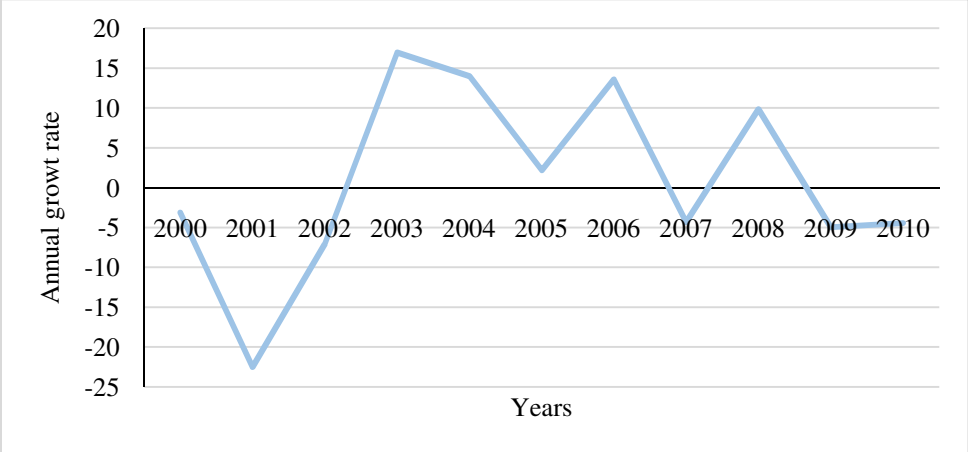

Figure-1
Annual growth rates in ornamental fish trade in Sri Lanka (2000-2010)

Figure-2
Compound annual growth rate of ornamental fish industry in Sri Lanka

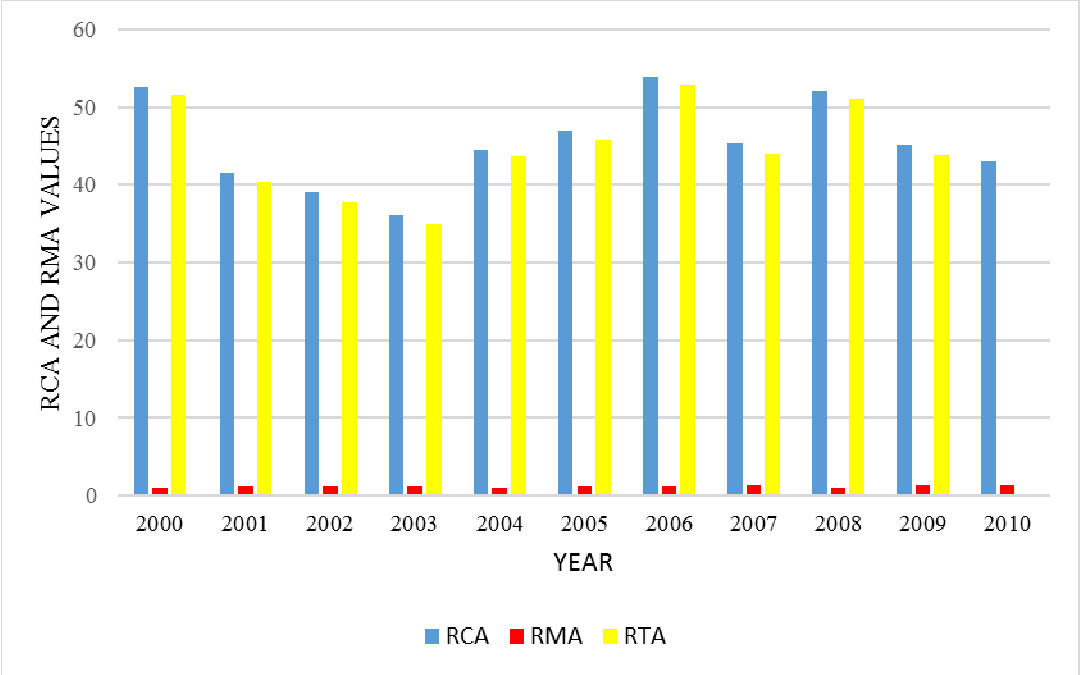

Figure-3
RMA, RCA and RTA values changing from year 2000-2010

Table-1
Trade index parameters of ornamental fish trade in Sri Lanka (2000-2010)

Year	RCA	RSCA	RMA	RTA
2000	52.53	0.96	0.99	51.55
2001	41.59	0.95	1.13	40.46
2002	39.01	0.95	1.23	37.79
2003	36.09	0.94	1.21	34.88
2004	44.56	0.95	0.92	43.64
2005	46.96	0.95	1.19	45.77
2006	53.91	0.96	1.09	52.82
2007	45.35	0.95	1.29	44.05
2008	52.01	0.96	0.95	51.07
2009	45.10	0.95	1.26	43.85
2010	42.96	0.95	1.27	41.69

Considering about the changes in market share/ export competitiveness index it was apparent that peak market share changing was recorded in the year 2000 and relevant value was 1.36. Since then it was reduced and lowest export competitiveness index was recorded in the year 2003 and that was 0.87. In the years of 2003, 2004, 2005 and 2007 and 2009 Sri Lanka shows export competitiveness below the value of 1. This illustration is exhibited in the figure-4.

Changes in the unit value over the 2000-2010 decade. Peak unit value was recorded in the year 2008 and lowest value was recorded in the year 2000 as exemplify by figure-5. In year 2000 Sri Lanka has earned 7.38 US $/ Kg and in year 2010 it was recorded as the 11.34 US $/ Kg. the pattern of unit value changing shows the exponential increases over the decade.

Discussion: Sri Lanka, being a tropical island in Indian Ocean, possess wide array of environments which are suitable for ornamental fish culture. In Sri Lankan perspective both freshwater and marine water ornamental fish were exported over the decades. This includes the wild captured freshwater and marine water species and culture based ornamental fish species as well.

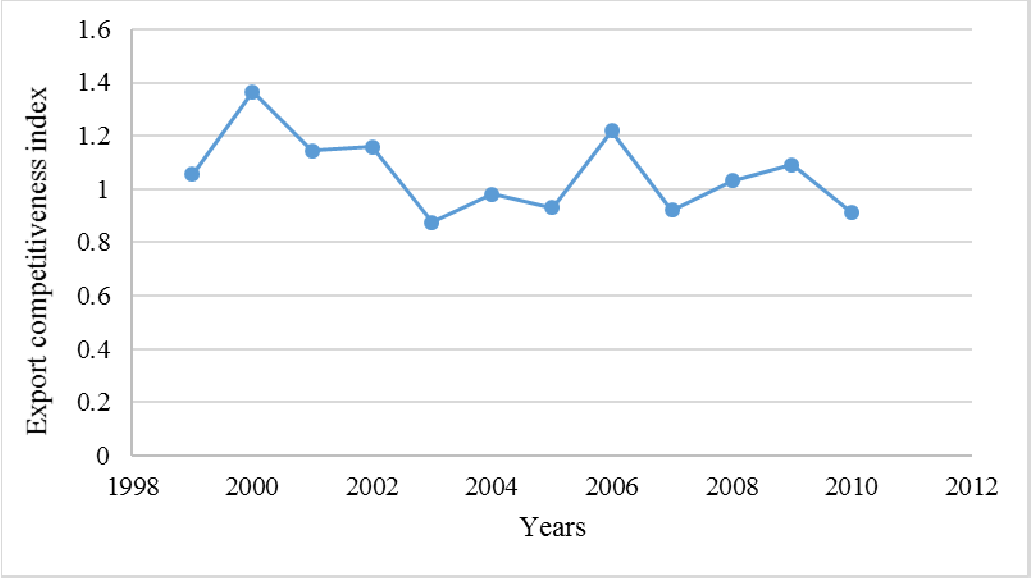

Figure-4
Export competitiveness index for Sri Lankan ornamental fish industry (2000-2010)

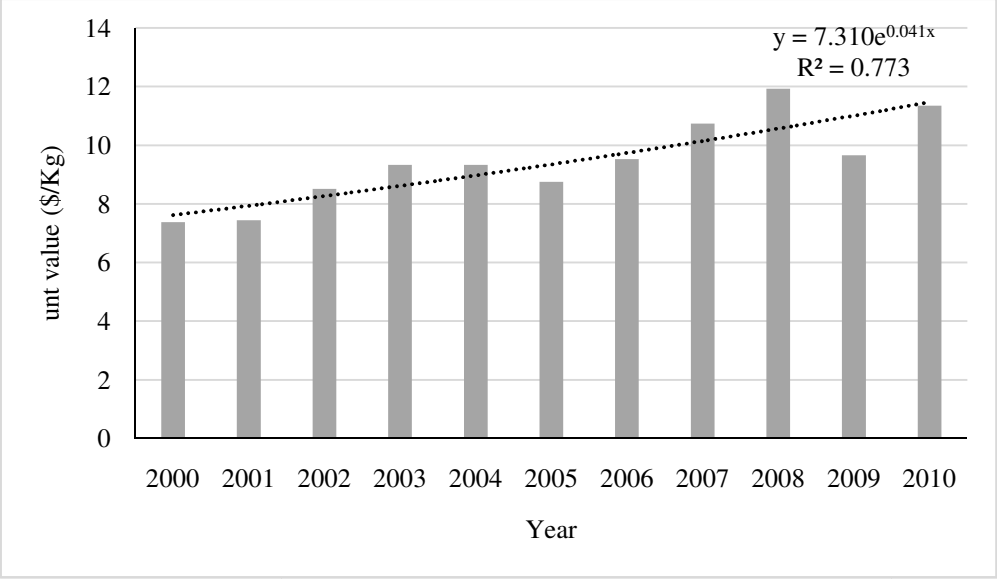

Figure-5
Unit value changing of exported ornamental fish (2000-2010)

Comparing the competitive trade advantage it was revealed that over the past decade, Sri Lanka gain higher competitiveness for exporting ornamental fish. In Ricardo theorm, country having comparative advantage can succeed the international trade and in that context, same country produces comparatively advantageous products frequently[13]. In that scenario Sri Lanka has huge potential over the exporting ornamental fish. Predominant sector in the Sri Lankan ornamental fish trade is its marine sector. Sri Lanka has significantly high export economic value on the ornamental fish trade and exports are exported more than 40 countries in world[14].

Diversification of the marine ornamental fish products may increase the potential in higher export earnings to Sri Lanka. Most exported species of Sri Lanka included the *Labroides dimidiatus, Dascyllus trimaculatus, Acanthurusl-eucosternon, Ecsenius bicolor* and *Amphiprion clarkii* respectively[15]. Further research on the captive breeding of this species rather than tapping from wild may increase high production, exporting and sustainability of environment. In this prospect induced spawning may be advantageous. With regard to raising and captivity breeding of marine fish it is always a daunting task. But some of species can induced by pituitary hormone injection[16]. Exporting of freshwater fishes is another governing sector for this kind of improvements in Sri Lanka. Exporting of ornamental endemic fish is 0.001% of the total trade and it was negligible comparing with whole trade[5]. In Sri Lanka 67% of export earnings by number consisted with guppy[17]. Further research on this fish species in order to produce new varieties is much more important in this context.

Considering with the relative trade advantage, it was revealed that highest relative trade advantage recorded in the year of 2006. Higher relative trade advantage of the ornamental fish exporting indicated that the policy formulation on the ornamental fish trade has beneficial factors towards the industry. This was exemplify by the higher unit value realization over the decade which shows exponential growth.

Higher competitiveness of the ornamental fish industry may be cause by different factors. Credibility and value is created by certifying each shipment through the quality control system of the Department of Animal Quarantine and Health. In addition to that major ornamental fish breeding center in Rambadagalla under the supervision of National Aquaculture Development Authority may be reason in case of providing training, supplying brooders, disease identification to investors, farmers in Sri Lanka[18].

Supply chain management is another important factor behind the improvements of the industry. Supply chain consisted number of parties including the collectors, aqua culturists, exporters, breeders, freight agent etc. proper coordination among these parties may increase the production and eventually increase the export earnings. Currently in Sri Lanka has recorded more than 30 exporters in actively participated in the industry. Further expansion of this number also become an imperative to enhanced production for continues competitiveness in the industry.

Conclusion

From this study it was revealed that Sri Lanka has higher comparative advantage over the ornamental fish export. Although there were fluctuations there is substatianal unit value for the ornamental fish in Sri Lanka. Data reveals that the major exporting country of ornamental fish of Sri Lanka was the USA, UK and France in year 2013. Untapped resources such as fresh water endemic fish has huge potential over the export earnings in future prospect with innovation of the technologies in captive breeding. Expansion of ornamental fish exporters, subsidies in the industry may be impetus over the increase export earnings furthermore.

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